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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/713,493
Filing Date: November 14, 2003
Appellant(s): TREWILER ET AL.

William J. Zychlewics
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 1/5/2010 appealing from the Office action mailed 5/27/2009.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,438,838	MEIER ET AL.	8-2002
3,650,635	WACHTELL ET AL.	3-1972
6,912,446	WANG ET AL.	6-2005
6,238,187	DULANEY ET AL.	5-2001

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 3, 5, 6 and 22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The new limitation of "providing a replacement blade portion that is produced using a **substantially similar method** as

was used to produce the removed portion wherein the method includes at least one of forging and casting" as recited in claim 1, lines 9-11 is considered new matter. Note that specification, paragraph [0022], discloses that the replacement (undamaged) portion (120) **may be fabricated from a material similar** to damaged portion (90), thereby more closely matching the original material, i.e. forged vs. cast. However, there is no support in specification that the replacement blade portion is produced by using a **method substantially similar** as the method used to produce the removed (damaged) portion.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 3, 5 and 6 are rejected under 35 U.S.C. 103(a) as obvious over Meier et al. (US 6,438,838) in view of Wachtell et al. (US 3,650,635) or in alternative as obvious over Meier et al. in view of Wang et al. (US 6,912,446) and Wachtell et al.

As applied to claims 1 and 6, Meier et al. teach a method of replacing a portion of a gas turbine engine rotor blade, the hollow (claim 18) rotor blade having an original blade contour defined by a blade first sidewall and a blade second sidewall, said method comprising:

cutting through the rotor blade such that a cut line extends from a leading edge of the blade to a trailing edge of the blade and between the first sidewall and the second sidewall, and such that the cut line extends at least partially through a hollow portion of the blade defined between the first and second sidewalls;

removing the portion of the rotor blade that is radially outward of the cut line; and
coupling with resistance welding (col. 1, lines 31-35) a replacement blade portion to remaining blade portion at a joint defined by the cut line with a weld joint extending along the cut line such that a newly formed rotor blade is formed with an aerodynamic contour that is one of an improvement in an aerodynamic performance over the original blade contour and mirroring the original blade contour (Abstract, Figs. 1-4).

Meir et al. teach that it is well known in the art to use resistance welding to join vanes to the rotor carrier of a turbine engine (col. 1, lines 31-35) and that the coupling is done at a joint defined by the cut line (24, Fig. 4) and that it constitutes a high yield automated process of joining.

Meier et al. teach the invention cited including using an automated process (Fig. 4, col. 3, lines 53-60) and resistance welding the replacement vane section and that the replacement portion of the blade is made of titanium (claim 16) and nickel alloy (claim 17) but do not explicitly teach using a welding material including at least one of a nickel alloy and a titanium alloy and the step of single weld forming a single weld joint and that the a substantially similar method including at least one of forging and casting was used to produce both the damaged and replacement portions.

Wachtell et al. teach a method of repairing a damaged hollow turbine blade by removing a damaged area and inserting a replacement section (of the **same material** as the original component, i.e. nickel alloy, titanium alloy, col. 3, lines 4-9 and **made by similar "casting" method** as original damaged portion, col. 1, lines 49-58 & col. 2, lines 42-49) and welding the parts together with electron beam welding (well known in the art to provide a single pass weld) to provide a single weld joint along the cut line such that the newly formed rotor blade has even better and more improved characteristics than the original blade (Figs. 1, 3 & 4, col. 1, lines 53-58, col. 3, lines 50-53).

It would have been obvious to one of ordinary skill in the art at the time of invention to have provided Meier et al. with a single pass weld as taught by Wachtell et al. in order to provide a weld joint resulting in a better and more improved characteristics of the repaired blade than the original blade.

Note that Wachtell et al. teach the material for the base and replacement sections is the same including at least one of a nickel alloy and a titanium alloy. As such, the weld lines 27-29 (Fig. 4) made by the electron beam welding includes the welding material (from either base and/or replacement sections) made of nickel alloy and /or titanium alloy.

In alternative if the Appellants do not agree that Wachtell et al. teach the weld material including at least one of a nickel alloy and a titanium alloy, then Wang et al. in a method for repairing a damaged airfoil teach that it is well known to use a

repair/replacement material and weld material to be the same as the base material in order to facilitate the welding of the replacement material to the surface of the damaged blade material (col. 5, lines 20-28).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to have provided Meier et al. with a weld material made of the same material as the base blade (i.e. nickel alloy, titanium alloy) as taught by Wang et al. in order to provide an effective weld joint between the replacement portion and base blade.

It would have been further obvious to one of ordinary skill in the art at the time of invention to have provided Meier et al. with a single pass weld and a replacement portion made by similar method as the damaged portion, as taught by Wachtell et al. in order to provide a weld joint resulting in a better and more improved characteristics of the repaired blade than the original blade.

As applied to claim 3, Meier et al. teach that a further machining step is performed subsequent to the welding step to a desired finished dimension (col. 4, lines 13-17). Note that Meier et al. disclosure of "it may require removal in a subsequent machining step" teaches that the thickening dimension at that point is not desired and therefore the machining step will result in a desired finished dimension.

As applied to claim 5, Meier et al./Wachtell et al. teach the invention cited wherein Wachtell et al. teach that material of replacement and remaining blade portions

are the same (col. 1, line 56) and that the compositions of superalloys used for turbine component/blade comprise of nickel-base alloy including titanium (col. 3, lines 4-9) and cobalt-base alloy including iron (Fe, col. 3, lines 10-14).

Claim 22 is rejected under 35 U.S.C. 103(a) as obvious over Meier et al. in view of Wang et al. and Wachtell et al., as applied to claim 1, and further in view of Dulaney et al. (US 6,238,187).

Meier et al./Wang et al./Wachtell et al. teach the invention cited including a blending of the weld-repair region by NC tool (Wang et al., claim 15, lines 21-22) but do not explicitly teach the steps of rough and final blending the welded replacement blade portion.

However, Dulaney et al. teach a method of repairing an airfoil having a damaged area wherein a section of the airfoil containing the damaged area is removed and a replacement piece is welded followed by rough and final blending of the replaced portion is used to achieve a finished dimension as necessary to put the joined airfoil within predetermined tolerances (col. 14, lines 20-28).

It would have been obvious to one of ordinary skill in the art at the time of invention to have provided Meier et al./Wang et al./Wachtell et al. with a rough and final blending as taught by Dulaney et al. in order to provide a finished blade that would meet the original dimensional requirements.

(10) Response to Argument

Appellants mainly argue (Appeal Brief, Argument, page 3, paragraph (A)) by citing excerpts of MPEP that the claim language in a patent application need not be described literally and may disclose an inherent feature even when the feature is not explicitly disclosed in the specification. Thus, Appellants believe that the disclosure (Appellants Specification, paragraph [0022]) teaching of **“undamaged portion 120 may be fabricated from a material similar to damaged portion 90 thereby more closely matching the original material, i.e. forged vs. cast”** provides support for the limitation recited in claim 1 of **“providing a replacement blade portion that is produced using a substantially similar method as was used to produce the removed portion wherein the method includes at least one of forging and casting.”**

To further support this assertion, Appellants submit that in order to closely match an “original material, .i.e. forged vs. cast” it is necessarily present, and would be recognized by persons of ordinary skill in the art, that a forged original material be made by forging and a cast original material be made by casting. As such, Appellants believe that claims 1, 3, 5, 6 and 22 do indeed comply with the requirements of 35 USC112, first paragraph.

The Examiner respectfully disagrees with the above arguments. It is true that similar methods of manufacturing may result in fabricating a similar part or material (i.e. casting to produce cast material and forging to produce forged material) however, one cannot use a blanket statement that many different casting techniques (all considered

as similar casting methods) and many different forging techniques (all considered as similar forging methods) would result in the same cast and forged parts, respectively. Using the rationale by the Appellants, can one conclude that a cast *iron* replacement part made by casting method is equally suited to be welded to the existing cast *titanium alloy* blade portion? Furthermore, although the specification is explicit that the replacement parts can be formed of the same cast or forged material, there is no disclosure that the casting and forging processes need be "substantially similar" as now claimed. For example, the casting and forging processes used for the replacement parts can be made by vastly different casting and forging processes (and thus not be "substantially similar"), and yet still be made of the same materials.

Appellants further argue (Appeal Brief, Argument, paragraphs (B) and (C), pages 5-7) with respect to rejection of claims 1, 3, 5, 6 and 22 that none of the applied art (Meier, Wachtell, Wang, Dulaney) describes or suggests providing a replacement blade portion that is produced using a substantially similar method as was used to produce removed portion wherein the method includes at least one of forging and casting.

The Examiner believes that the Appellants are using the limitation of "similar method" instead of "same material" in order to overcome the applied art as if none of the art used in the rejection of claims 1, 3, 5, 6 and 22 teaches the limitation of "similar method."

However, the Examiner submits that Wachtell et al. explicitly teach a method of repairing a damaged hollow turbine blade by removing a damaged area and inserting a

replacement section (of the **same material** as the original component, i.e. nickel alloy, titanium alloy, col. 3, lines 4-9 and **made by similar "casting" method** as original damaged portion, col. 1, lines 49-58 & col. 2, lines 42-49) and welding the parts together and there is ample motivation to combine Wachtell et al. with Meier et al. that would result in a newly formed/repaired rotor blade that has better and more improved characteristics than the original blade.

As such, the combination of applied art, still render obvious the Appellant's invention.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/SARANG AFZALI/

Examiner, Art Unit 3726

3/12/2010

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